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## **Education**

Ph.D. in Physical Chemistry 1987 University of Pennsylvania, Philadelphia, Pennsylvania  
B.S. in Physics 1979 Virginia Polytechnic Institute and State University, Blacksburg, Virginia

## **Appointments**

4/2001-present	Project Manager for Operations and Beamline Development, National Inst. of General Medical Science / National Cancer Inst. Collaborative Access Team, Biosciences, Argonne National Laboratory
2000-4/2001	Associate Director for Operations and Beamline Development, Biophysical Collaborative Access Team, Advanced Photon Source, Argonne National Laboratory
1998-2000	Senior Managing Beamline Scientist, Biophysical Collaborative Access Team, Advanced Photon Source, Argonne National Laboratory
1998-1999	Lecturer, Department of Biological, Physical and Chemical Sciences, Illinois Institute of Technology
1996-1998	Senior Beamline Scientist, Biophysical Collaborative Access Team, Advanced Photon Source, Argonne National Laboratory
1994-1995	Associate Director, Regional Center for Time Resolved X-ray Spectroscopy, National Synchrotron Light Source, Brookhaven National Laboratory
1993-1994	Assistant Director, Biostructures Institute, University City Science Center and Biostructures Participating Research Team, National Synchrotron Light Source, Brookhaven National Laboratory
1987-1992	Staff Scientist, Biostructures Institute, University City Science Center and Biostructures Participating Research Team, National Synchrotron Light Source, Brookhaven National Laboratory
1987-1989	Postdoctoral Fellow, Laboratory for Research on the Structure of Matter, University of Pennsylvania
1982-1983	Graduate Teaching Assistant, Department of Chemistry, University of Pennsylvania

## **Accomplishments**

Managing the design and build of three beam lines to be built at the GM/CA CAT at the APS including the first dual-canted-undulator geometry, built a technical team to support the design, build and ultimately operations of the facility.

Constructed the BioCAT insertion device beamline for X-ray scattering and X-ray Absorption Spectroscopy on schedule (less than two years) and under budget.

Developed an X-ray detector for microsecond time-resolved X-ray diffraction experiments.

Implemented intensity and position feedback of X-ray beam, significantly improved thermal stability of cryogenically cooled monochromator, developed procedures for rapid slew scans, slew EXAFS scans, and automated beamline set up.

Determined that a single monolayer of buckminsterfullerene ( $C_{60}$ ) covalently tethered to a silicon oxide surface is organized in a primitive, planar hexagonal lattice.

Demonstrated the development of cation dependent layer-to-layer intermolecular correlations in ultra thin Langmuir-Blodgett multilayer films.

First to determine that an asymmetry existed in the structure of the "up-stroke" and "down-stroke" monolayers in ultra thin Langmuir-Blodgett multilayer films.

Showed that the structure of the photoproduct of carbonmonoxy-myoglobin is different from that of deoxy-myoglobin via X-ray absorption spectroscopy at cryogenic temperatures.

## Experience

### X-Ray Techniques:

Over 24 years experience using synchrotron radiation. Time-resolved resonance and time-averaged nonresonance X-ray diffraction of partially ordered systems including Self Assembled Monolayers, Langmuir-Blodgett films, and protein multilayer films and vectorially oriented protein monolayers. Fiber diffraction. X-ray holography/interferometry. Grazing incidence X-ray scattering from monolayer and multilayer films on solid and liquid substrates (Langmuir monolayers). Time-resolved X-ray absorption spectroscopy of photolabial systems. Determination of rocking curves width, crystallographic orientation of Si ingots and wafers, and x-ray topography for monochromator crystals.

### X-Ray Sensitive Detectors:

CCD, SIT, FUJI Imaging plates, X-ray film, 1- and 2-dimensional gas filled, proportional wire counters, transmission and fluorescence ion chambers, energy resolving Ge-detector arrays, PIN photodiodes, scintillation based detectors. Integrating and single photon counting electronics.

### X-Ray Optics:

Over 20 years experience in the design of x-ray optics for high brilliance x-ray generators, 2<sup>nd</sup> and 3<sup>rd</sup> generation synchrotron radiation sources. Constant exit height, cryogenically cooled, double crystal monochromators, sagittally focusing monochromators. X-ray mirrors for harmonic rejection and focusing. Fresnel Zone Plates. Bragg and Laue analyzers. Laser LTP metrology of x-ray optical components.

### Computing and instrumentation Control:

Extensive experience in interfacing X-ray detectors and motion control for time-resolved X-ray diffraction and spectroscopy experiments via CAMAC and VME hardware.

## Publications

1. Chance, B., Barlow, C., Nakase, Y., Takeda, H., Mayevesky, A., Fischetti, R., Gramham, N. and Sorge, J. (1978) Heterogeneity of Oxygen Delivery in Normoxic and Hypoxic states: A Fluorometer Study. Am. J. Physio. 235(6):H809-H820.
2. Chance, B., Fischetti, R., Powers, L. (1983) The Structure and Kinetics of the Photoproduct of Carboxymyoglobin at Low Temperatures, An X-Ray Absorption Study. Biochem. 22:3820-3829.
3. Fischetti, R.F., Filipkowski, M., Garito, AF. and Blasie, J.K. (1988) Profile Structures of Ultrathin Periodic and Nonperiodic Multilayer Films Containing a Disubstituted Diacetylene by High Resolution X-ray Diffraction. Phys Rev B 37:4714-4726.
4. Fischetti, R.F., Skita, V., Garito, A.F. and Blasie, J.K. (1988) Asymmetry in the Interior Arachidic Acid Bilayers Within Ultrathin Multilayers Fabricated via the Langmuir-Blodgett Technique. Phys Rev B 37:4788-4791.
5. Pachence, J.M., Fischetti, R.F. and Blasie, J.K. (1989) Location of the Heme-Fe Atoms within the Profile Structure of a Monolayer of Cytochrome c Bound to the Surface of an Ultrathin Multilayer Film. Biophys. J. 56:327.
6. Amador, S.Itl., Pachence, J.M., Fischetti, R., McCauley, J.P. Jr., Smith, A.B. III, Dutton, P.L. and Blasie, J.K. (1990) X-ray Diffraction Studies of Protein Monolayers Bound to Self-Assembled Monolayers. Materials Research Society Symposium Proceedings 177:393-398.
7. Fischetti, R.F., Xu, S. and Blasie, J.K. (1991) Development of Cation-Dependent Layer to Layer Intermolecular Correlations in 5-Bilayer Arachidic Acid Multilayers. Materials Research Society Symposium Proceedings 208:231-236.
8. Rosenbaum, G., Sullivan, M., Fischetti, R., Rock, L., "Sagittally Focusing Scanning Monochromator Produces 0.4-mm Focus". Review of Scientific Instrumentation 63: 931, 1992.
9. Amador, S.M., Pachence, J.M., Fischetti, R.F., McCauley, J.P. Jr., Smith, A.B. III and Blasie, J.K. (1993) The Use Of Self-Assembled Monolayers to Covalently Tether Protein Monolayers to the Surface of Solid Substrates. Langmuir 9(3):812-817.
10. Xu, S., Fischetti, R.F., Blasie, J.K., Peticolas, L.J. and Bean, J.C. (1993) Profile Structures of Self-Assembled

- Monolayers on Ge/Si Multilayer Substrates by X-Ray Interferometry/Holography. *J. Phys. Chem.* 97(9):1961-1969.
11. Chupa, J.A., Xu, S., Fischetti, R.F., Strongin, R.M., McCauley, J.P. Jr. Smith, A.B. III, Blasie, J.K., Peticolas, L.J. and Bean, J.C. (1993) A Monolayer of C60 Tethered to the Surface of an Inorganic Substrate: Assembly and Structure. *J. Amer. Chem. Soc.* 115:4383-4384.
  12. Asturias, F.J., Fischetti, R.F. and Blasie, J.K. (1994) Changes in the Profile Structure of the Sarcoplasmic Reticulum Membrane Induced by Phosphorylation of the Ca<sup>2+</sup>-ATPase Enzyme in the Presence of Terbium: A Time-Resolved X-Ray Diffraction Study. *Biophys. J.* 66:1653-1664.
  13. Asturias, F.J., Fischetti, R.F. and Blasie, J.K. (1994) Changes in the Relative Occupancy of Metal-Binding Sites in the Profile Structure of the Sarcoplasmic Reticulum Membrane Induced by Phosphorylation of the Ca<sup>2+</sup>-ATPase Enzyme in the Presence of Terbium: A Time-Resolved, Resonance X-Ray Diffraction Study. *Biophys. J.* 66:1665-1677
  14. Murphy, M.A., Nordgen, E., Fischetti, R.F., Blasie, J.K., Peticolas, L.J. and Bean, J.C. (1995) A Structural Study of the Annealing of Alkylsiloxane Self-Assembled Monolayers on Silicone by High Resolution X-Ray Diffraction. *J. Phys. Chem.* 99:14039-14051
  15. Chance, M.R., Miller, L.M., Fischetti, R.F., Scheuring, E., Huang, W.X., Sclavi, B., Hai, Y. and Sullivan, M. (1996) Global Mapping of Structural Solutions Provided by the Extended X-Ray Absorption Fine Structure ab Initio Code FEFF 6.01: Structure of the Cryogenic Photoproduct of the Myoglobin-Carbon Monoxide Complex. *Biochemistry*, 35:9014-9023.
  16. Scheuring, E. M., Clavin, W., Wirt, M. D., Miller, L. M., Fischetti, R. F., Lu, Y., Mahoney, N., Xie, A. H., Wu, J. J., and Chance, M. R. (1996). Time-Resolved X-ray Absorption Spectroscopy of Photoreduced Base-off Cob (II) Alamin Compared to the Co (II) Species in Clostridium Thermoaceticum. *J. Phys. Chem.* 100 (9): 3344-3348.
  17. Zhong, Z., Chapman, D., Bunker, B., Bunker, G., Fischetti, R., Segre, C. (1999). A Bent Laue Analyzer for Fluorescence EXAFS Detection. *J. Synchrotron Rad.* 6:212-214.
  18. Irving, T.C., Fischetti, R., Rosenbaum, G., and Bunker, G.B. (2000). Fiber Diffraction Using the BioCAT Undulator Beamline at the Advanced Photon Source. *Nucl. Instr. Meth.(A)* 448:250-254.
  19. Ivanov, I., Rosenbaum, G., Chrzas, J., Fischetti, R., Segre, C. and Chapman, L.D. (2000). A Robust Cryogenic Crystal Design in Use at the APS. *Synchrotron Radiation Instrumentation: Eleventh US National Conference*, AIP Press, NY 521:271-275.
  20. Karanfil, C., Zhong, Z., Chapman, L.D., Fischetti, R., Bunker, G.B., Segre, C.U., and Bunker, B.A. (2000). A Bent Laue Analyzer Detection System for Dilute Fluorescence XAFS, Synchrotron Radiation Instrumentation: Eleventh US National Conference AIP Press, NY 521:276-282.
  21. Irving, T.C., Konhilas, J., Perry, D., Fischetti, R., and deTombe, P.P. (2000) Myofilament Lattice Spacing as a Function of Sarcomere Length in Isolated Rat Myocardium. *American Journal of Physiology, Heart Circ Physiol* 279:H2568-H2573.
  22. Irving, T.C., Fischetti, R., Rosenbaum, G., and Bunker, G.B. (2000). Fiber Diffraction Using the BioCAT Undulator Beamline at the Advanced Photon Source. *Fibre Diffraction Review*, 9: 59-61.
  23. Orgel, J.P., Miller, A., Irving, T.C., Fischetti, R.F., Hammersley, A.P. and Wess, T.J. (2001) The *in situ* supermolecular structure of type I collagen. *Structure (Camb)* 9(11):1061-1069.
  24. Orgel, J. P., Miller, A., Irving, T. C., Fischetti, R. F., Hammersley, A. P., and Wess, T. J. (2001) The three dimensional molecular packing of native type I collagen. *Structure*, 9:1-20.
  25. Orgel, J. P., Miller, A., Irving, T. C., Fischetti, R. F., Hammersley, A. P., and Wess, T. J. (2002) Recent insights onto the three dimensional molecular packing structure of native type I collagen. *Fiber Diffraction Review*, 10:40-49.
  26. Fischetti, R. F., Rodi, D. J., Mirza, A., Irving, T. C., Kondrashkina, E., and Makowski, L. (2003) High-resolution wide-angle x-ray scattering of protein solutions: effect of beam dose on protein integrity. *J. Synch. Rad.*, 10: 398-404.
  27. Fischetti, R., Stepanov, S., Rosenbaum, G., Barrea, R., Black, E., Gore, D., Heurich, R., Kondrashkina, E., Kropf, A. J., Wang, S., Zhang, K., Irving, T. C., Bunker, G. B. (2004) The BioCAT undulator beamline 18ID: a facility for biological non-crystalline diffraction and x-ray absorption spectroscopy at the Advanced Photon Source. *J. Synch. Rad.* 11:399-405.

28. Reconditi, M., Linari, M., Lucii, L., Stewart, A., Sun, Y. B., Boesecke, P., Narayanan, T., Fischetti, R. F., Irving, T., Piazzesi, G., Irving, M., Lombardi, V. (2004) The myosin motor in muscle generates a smaller and slower working stroke at higher load. *Nature* 428 (6982): 578-81.
29. Xu, S., Fischetti, R. F. (2004) A Ray-Tracing Study of the Dependence of Focal Properties on Surface Figure Error for a Kirkpatrick-Baez (K-B) Mirror System. American Inst. of Physics, pg. 776-770.
30. Fischetti, R. F., Rodi, D. J., Gore, D. B., and Makowski L., Wide angle x-ray solution scattering as a probe of ligand-induced conformational changes in proteins. *Accepted for publication in Chemistry and Biology*.
31. Fischetti, R.F., Kneller, L.R., Rosenbaum, G. and Blasie, J.K., A Fast Time-Framing Multielement Detector for Microsecond Time-Resolved X-ray Diffraction. *Accepted for publication in Biophys. J.*
32. Barrea, R. A., Fischetti, R., Stepanov, S., Rosenbaum, G., Kondrashkina, E., Bunker, G. B., Black, E., Zhang, K., Gore, D., Heurich, R., Vukovich, M., Kropf, A. J., Wang, S., and Irving, T. C., Biological XAFS at the BioCAT Undulator Beamline 18ID at the APS. *Accepted for publication in Physica Scripta*.

### **Committees**

Chairman, APS Beamtime Allocation Committee for Macromolecular Crystallography.

Member, IMCA-CAT External Review Board.

Member, LS-CAT Review Committee.

Member, HP-CAT Technical Advisory Committee.

Member, Dual-Canted Undulator Front End Design Review Committee.

Member, APS Electronic Document Management System Task Force.

Member, BIO Division Promotions and Hiring Committee

### **Membership**

American Crystallographic Association